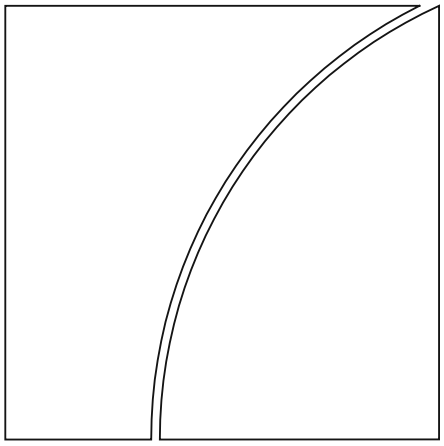

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Monetary policy and private equity acquisitions: tracing the links*

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Abstract

Private equity funds play an increasingly important role in financial systems. Yet, the impact of monetary policy on their activity has been little explored so far. In this paper, we analyse the transmission of monetary policy through private equity (PE) deals, focusing on the impact on: (i) the volume of private equity deals; (ii) the use of leverage; and (iii) the pricing of those deals. We find that contractionary monetary policy shocks to the short end of the yield curve tend to dampen private equity activity, by reducing deal volumes, the use of leverage and deal prices. A credit channel of monetary transmission seems to affect deal volumes and the use of leverage, while a valuation channel appears to drive the transmission to deal pricing. Monetary policy shocks to the long end of the yield curve have weaker effects on PE activity.

Key words: Private equity; buyouts; monetary policy; credit spreads, equity risk premium

JEL: G21, G32, F32, F34

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1 Introduction

Over recent decades, financial intermediation in the United States and other advanced economies has increasingly migrated from banks towards non-bank financial intermediaries (NBFIs). The steep growth of so-called "private capital markets", whose activity has boomed during the past two decades, represents one of several trends related to this shift in financial intermediation. This comprises private credit funds directly lending to smaller and riskier corporate borrowers and private equity funds pooling capital to acquire stakes in private companies or public companies that are taken private (Avalos et al. [2025]). While there have been a number of recent papers analysing the propagation of monetary policy through private credit funds (e.g. Banerjee and Serena [2024], Cucic and Gorea [2024]), little is known about monetary transmission through private equity.[1] This paper aims to contribute filling this gap by exploring the impact of monetary policy on private equity deals.

The ecosystem of private equity is comprised of a complex network of specialised investment funds, mostly raised from large institutional investors and managed by a differentiated class of alternative asset managers (AAMs).[2] Initially focused on investments in upstart new firms during the post-war 1940s, and more mature firms since the 1960s, these AAMs have expanded to traditional high-yield lending and the financing of an ample variety of "real assets" opportunities, including commodities, infrastructure projects and real estate (Aramonte and Avalos [2021], Avalos et al. [2025]). With their flexibility and increasing financial sophistication, private market funds in their many specialisations have been able to cater to the financial needs of all sorts of firms, from upstarts to mature, and from traditional to cutting-edge sectors. Amid the many different types of private market strategies, we focus on mergers and acquisitions (ie buyouts and growth investment) and early investment in

[1] The report by Ivashina [2022] discusses the link between the private equity industry and the interest rate environment more broadly without presenting formal empirical evidence. In a forthcoming paper, Bellavitis et al. [forthcoming] analyse the impact of monetary policy on venture capital markets, a subset of the private equity deals we are covering in our analysis.

[2] For more details, see Ivashina and Lerner [2019] and Ivashina [2023].

upstart companies (ie venture capital), which represent a large share of this ecosystem. For simplicity, we generally refer to them as private equity deals or transactions. A common thread of all these activities is the pursuit of capital gains by means of increasing the intrinsic value of the firms in which they acquire an interest. However, they differ in the extent to which they rely on high yield borrowing to structure their deals. Nevertheless, they are roughly exposed to similar incentives and financial constraints, and they can be analysed within the confines of a common empirical model.

Previous work has investigated the impact of financial conditions on private equity acquisitions. Axelson et al. [2013] find that the capital structure of leveraged buyouts (LBOs),[3] and in particular the share of debt used in them (ie the leverage), depends on economy-wide credit conditions and not the specific cross-sectional features of the target firms. Haddad et al. [2017], on the other hand, find that the equity risk premium seems to be the key macroeconomic variable carrying the signal for increased LBO deal-making: a lower risk premium increases the present value of performance gains and decreases the opportunity cost of holding illiquid assets, encouraging LBO activity.

We build upon these previous insights by relying on an empirical model that is an extension of Haddad et al. [2017]. Our dataset is more comprehensive, and includes not only LBOs, but an assortment of minority-stake acquisitions, mostly related to venture, seed and incubator investments, and also so-called "growth investments" in relatively established corporates. While keeping credit spreads and equity risk premia as controls, as in previous studies, we introduce monetary policy shocks obtained from the high-frequency identification strategy of Cieslak and Schrimpf [2019] in order to assess monetary transmission through private equity activity. Our baseline analysis focuses on monetary policy surprises involving target rate decisions and forward guidance communications, i.e. monetary policy shocks moving the short end of the yield curve. In an extension of the baseline analysis, we further

[3]These are deals in which the private equity fund acquires a controlling stake in the target firm's equity, and the acquisition is partially funded with debt that is added to the balance sheet of the acquired entity.

consider monetary policy surprises affecting the long end of the term structure of interest rates, reflecting in particular news about central bank balance sheet policies, such as quantitative easing or tightening.

The results show that a monetary policy tightening – at the short end of the term structure – significantly diminishes the volume of private equity deals, as well as reduces the use of leverage and the pricing of targets. We relate these differential effects to the diverse ways in which surprises transmit through credit and valuation channels of monetary policy. Specifically, deal volumes and leverage are negatively affected by changes in the monetary policy stance and changes in credit spreads, pointing to the relevance of a credit channel through which both variables operate. By contrast, deal prices are negatively affected by changes in the monetary policy stance and the equity risk premium, highlighting a valuation channel. Our analysis further suggests that conventional monetary policy shocks operating through the short-end of the yield curve are more relevant for PE activity than unconventional monetary policy shocks working through the longer end. Monetary policy surprises that affect the long-end of the term structure retain some bearing on the volume of deals, but the transmission to pricing vanishes.

Our paper contributes to several strands of the literature. First, to the large body of research on the "shadow banking channel" of monetary policy. That is, how changes in policy shape credit market outcomes through different aspects of non-bank financial activity and intermediation. In general, researchers have found that non-bank lenders respond differently than banks to monetary contractions. Non-banks affect the transmission of monetary policy through credit supply: tighter policy reduces credit supply by banks, but increases risk taking by non-banks, which expand supply to households and riskier corporate borrowers, largely neutralising consumption and investment effects.[4] This literature has focused on the impact of monetary policy on NBFIs working within debt markets, including mutual fund

[4]See, for instance, Chen et al. [2018] Banerjee and Serena [2024], Drechsler et al. [2022], Elliot et al. [2022], Cucic and Gorea [2024], and references therein.

exposure to bond markets, and other NBFIs in loan markets, such as direct lenders. Closer to ours, the papers by Adra et al. [2020] and Fischer and Horn [2021] study the impact of monetary policy on merger and acquisitions (M&A). They find that policy affects a wide range of outcomes in this activity. Aggregate activity falls after a tightening monetary policy shock, and the credit channel – defined as the availability of financing in good enough terms to implement the transactions – seems to be a key driver. Moreover, following a tightening, stock market reactions to M&A announcements are more negative, the likelihood of deal withdrawal increase, and the acquirer tends to face higher financing hurdles in the post-acquisition period. Higher monetary policy uncertainty is associated with larger valuation discount to the acquirer, with the discount compensating investors for the higher riskiness of M&As in these conditions. Several of these findings translate seamlessly into our private equity framework.

Second, our findings add to research on the impact of financial conditions on private equity activity. Axelson et al. [2013] emphasise the importance of credit conditions while Haddad et al. [2017] document the key role of the equity risk premium. Aramonte and Avalos [2021] document that private market deals, not only in private equity but also in venture and growth capital investment and private credit, are highly procyclical. Specifically, deal volumes are highly positively correlated with returns of the S&P500 stock market index, after controlling for high-yield corporate bond returns. This finding is consistent with the argument of Haddad et al. [2017], as higher stock market returns correspond to falling equity risk premia.

Third, this paper also contributes to research on the financing of private equity transactions, which so far has focused on the behaviour and performance of target (acquired) firms. Early studies focusing in the US and UK markets suggested that LBO targets tended to materially increase profitability by cutting down investment or selling assets (Kaplan [1989], Chevalier [1995], Chevalier and Scharfstein [1996]) or reducing employment (Lichten-

berg and Siegel [1990]), while keeping operating income relatively unchanged. Boucly et al. [2011] analyse the behaviour of a set of French companies acquired through a LBO, and show that LBO targets become more profitable, but also grow much faster, increasing debt and capital expenditure. They conjecture that the business model of private equity managers may have changed, suggesting that these firms became able to relax credit constraints and exploit previously untapped growth opportunities. Haque [2023] argues that private equity managers are able to reduce the volatility and increase the return of the target's assets, allowing the company to simultaneously increase the optimal level of leverage while reducing the cost of financial distress. Haque et al. [2024] provide evidence that private equity investment encourage non-bank participation in the US syndicated loan market. Private equity sponsors achieve that by reducing the target companies' credit risk and lenders' expected losses, for instance by injecting equity under distress, or directly engaging with the targets' management.

The paper proceeds as follows: the next section introduces private equity within the wider context of private capital markets and summarises its main characteristics. Section 3 provides some conceptual considerations on the transmission of monetary policy through private equity activity. Section 4 describes our dataset. Section 5 presents the aggregated time series results for private equity activity deal volume, using the benchmark monetary policy shocks that affect the short end of the term structure. Section 6 focuses on the leverage of private equity transactions and section 7 on deal pricing. In Section 8 we present the results for the impact of monetary policy shocks that affect the long end of the yield curve. Finally, section 9 concludes. The appendix presents some robustness analysis for the benchmark deal pricing results.

2 Private equity: Some basics

Private capital markets, as they are understood nowadays, involve a number of financial activities that trace their roots to the beginnings of the US "venture capital" industry in the late 1940s.[5] At the time, investment pools gathered from rich families were dedicated to funding new enterprises focused on the commercial development of new technologies, many emerging from the war. Twenty years later, in the late 1960s, a new class of fledgling "private equity" funds began structuring LBOs as a way to offer liquidity – and a path to the stock market – to the retiring owners of private, often family owned businesses that had prospered in the post-war period. By then, pension funds and insurance companies had replaced rich families as a source of funding. More recently, private market funds have branched out to new activities including the financing of real estate, infrastructure and commodity production projects ("real assets"), and corporate lending, usually to relatively small and highly indebted firms.

Private market investments are typically funded through a mix of capital, provided by investors in specialised investment funds, and debt, sometimes funded by banks. The specialised investment funds are traditionally closed-end vehicles, which largely remove liquidity and maturity transformation concerns from the investment process. The ownership structure of these funds involves two main participants: general partners (GPs), which typically invest their own capital and manage the fund allocations, and limited partners (LPs) that only contribute financial capital. LPs are typically pension funds, insurance companies, family offices, sovereign wealth funds, official development agencies, and other "sophisticated" investors with long investment horizons and minimal liquidity mismatches. To boost returns, particularly in LBO transactions, some deals are partially financed with debt from corporate bond markets or banks. As an example, Table 1 presents the financial structure of the 2006

[5]This section is largely based on the description provided by Aramonte and Avalos [2021] and references there in.

acquisition of the European frozen foods division of Unilever by private equity firm Permira. The borrowing, mostly taken from banks, was still very elevated at the time, reaching almost 75% of the more than USD 2 billion value of the acquisition.[6]

Table 1: **Price and financial structure of PE buyouts: an example**
Permira Holdings acquisition of Unilever's frozen foods division (2006)

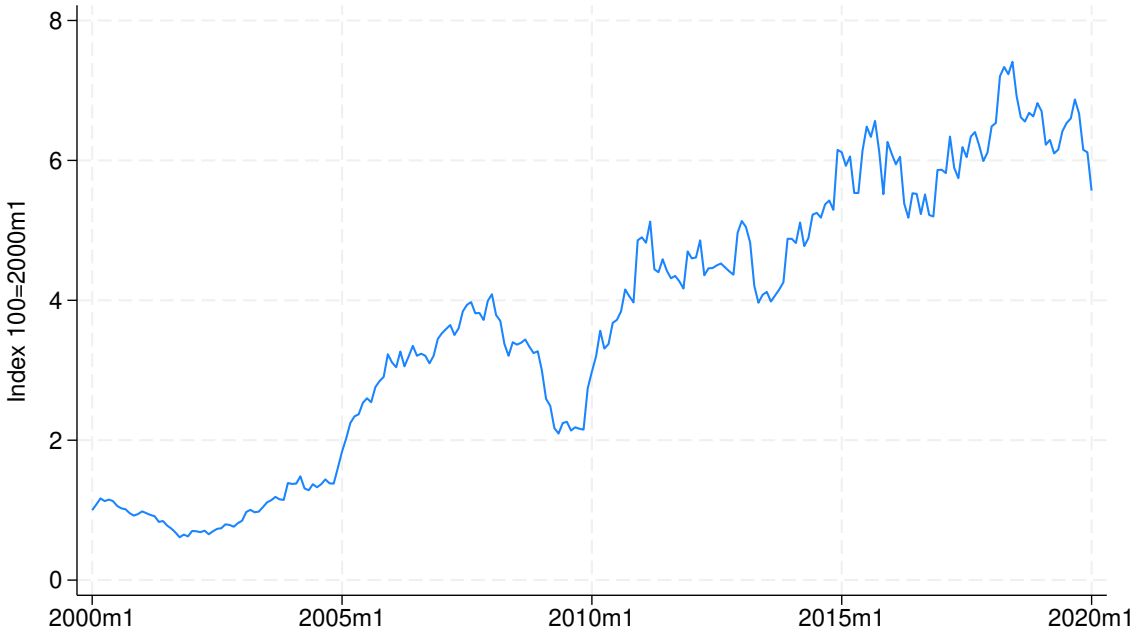
	US mn	**Spread**	**Maturity**	**EBITDA ratio**
Equity (1)	548	-	-	2.4
Debt (2)	1,654	-	-	7
Term Loan A	232	200	7.3	1.0
Term Loan B	472	225	8	2.1
Term Loan C	472	263	9	2.1
Mezzanine Debt	127	1,125	11	0.6
Mezzanine Debt	350	925	10	1.5
Credit line	223	200	7	1.0
Deal value (1+2)	2,202	-	-	9.7

This paper focuses on the activity of private market funds specialised in the acquisition of equity stakes in firms, through LBOs, growth or venture capital investments. For simplicity, we denote all of them as private equity (PE) deals, consistent with the extant literature. Typical targets of venture capital or private equity acquisitions include, respectively, early-stage private firms or more mature companies with a significant potential upside. In the case of the more mature firms, private equity fund managers usually will take a minority, pure-equity stake (so-called "growth investment"), or a leveraged majority stake. The latter is the case of LBOs, which often take companies out of public markets in order to implement value-enhancing and/or cost-saving restructurings. Traditionally, the valuation gains in any of these transactions were realized by ultimately floating the equity of the target firm in stock markets, or selling it to an existing, mature corporation.[7]

[6] In the early days, aggressive leverage ratios in excess of 4 times the equity investment were not uncommon (Borio [1990a] and Borio [1990b]).

[7] More recently, however, there has been an increase in fund-to-fund transactions ("secondaries"), where firms sponsored by a venture capital or private equity fund are sold to another private fund. Also in

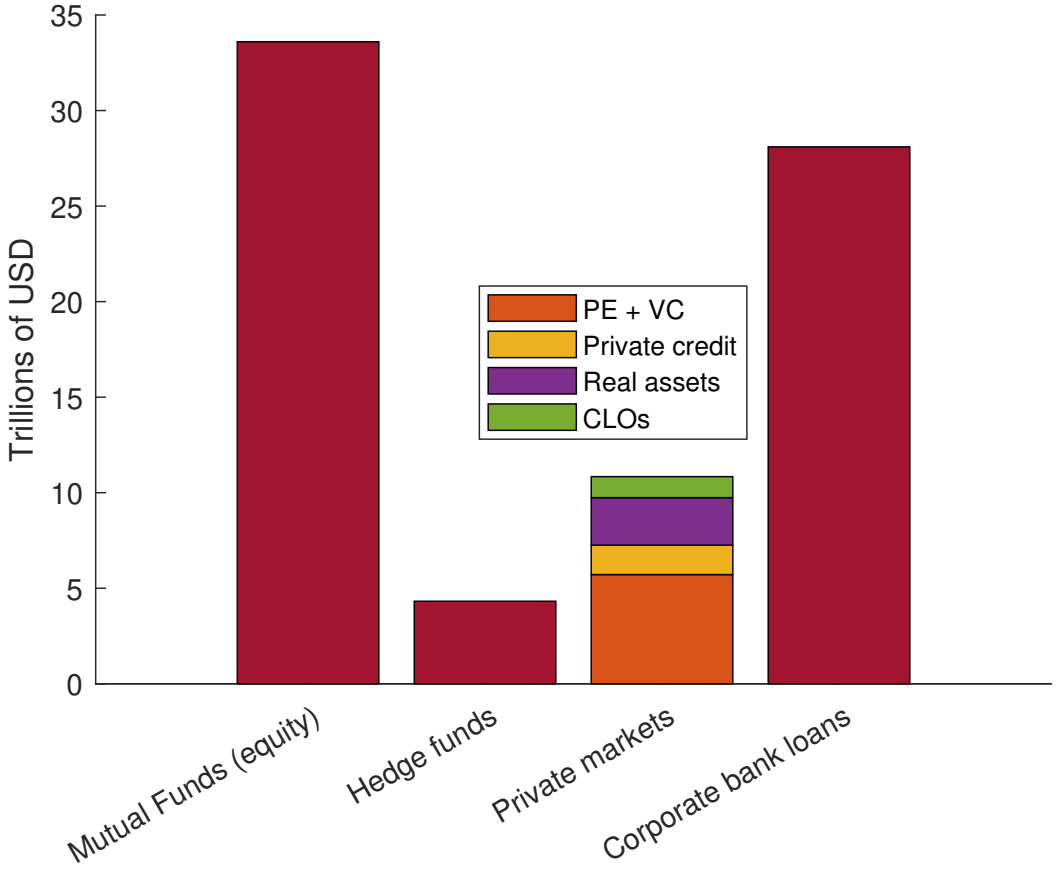
Figure 1: **Number of private equity deals**



In the two decades since the turn of the millennium, private equity activity has expanded rapidly. Figure 1 shows an indexed time series reflecting the increase in the number of private equity deals in the last 20 years, based on our sample. As indicated, the sample includes LBOs and venture or growth investments, leaving out the more recent extension into real assets and credit. Aside from a deep contraction after the 2008 global financial crisis, the PE volume has kept a rather stable upward trend since the dot-com crash of the early 2000s. In the eight years comprised between the Nasdaq collapse and the bankruptcy of Lehman Brothers, the number of deals quadrupled. After a brisk rebound from the 2008 trough that started in 2010, the number of deals grew to almost eight times the 2000 level by 2016. The number of deals declined afterwards, in particular in the aftermath of the Covid-19 crisis, but 2021 saw a forceful rebound – not included in our sample – as economies reopened amid plentiful liquidity.

recent years, private equity and venture capital growth has been spurred by technology deals, not only of firms that specialise in information and technology (IT), but also firms that have found innovative ways to deploy technology-based solutions in otherwise 'old-economy' sectors. Entrepreneurs and innovators seem to increasingly rely on these non-bank financial intermediaries to fund their projects, amid the gradual retrenchment of traditional banks.

Figure 2: **AUM of key players in corporate credit market, worldwide, 2021.**



Source: BIS banking statistics, ICI Factbook 2022, Preqin, PitchBook, JP Morgan.

Amid alternative asset classes, the AUM of private equity stands out even before factoring in the heavy leverage general partners (GPs) often use in some of the deals. Figure 2 shows that, with AUM approaching $6 trillion in 2021, private equity funds easily outstripped hedge funds, which are also heavily leveraged. Once the whole complex of private capital markets activities are taken into account (including CLOs[8]), their assets under management as of 2021 were about a third of banks' global outstanding corporate loans, or the assets under management of equity-focused mutual funds.

[8]CLOs, or collateralized loan obligations, are structured investment vehicles that invest mainly in leveraged loans. Their capital structure is tranched to offer investors shares of the investment pool with different credit risks and returns. For a more detailed description of CLOs, see Aramonte and Avalos [2019].

3 Monetary policy and private equity acquisitions: Conceptual considerations

In broad terms, monetary policy can affect PE activity through credit and valuation channels. The policy rate is a key determinant of funding costs, hence operating through broad credit channels. At the same time, by influencing the discount rate of the future stream of investment returns, as well as the returns themselves through its wider macroeconomic effects, monetary policy affects the prices of assets and investment projects through a broad valuation channel.

Previous work highlights the relevance of these two channels for PE activity. Axelson et al. [2013] have established that market-wide credit conditions affect the pricing of LBO transactions, and the degree of leverage used in the transactions. Cheap credit – in the form of lower credit spreads – encourages the use of more leverage, and that allows PE funds to pay more for target firms. They find that this general observation is unaffected by cross-sectional features of the target firm, including its pre-existing debt, industry, profitability and others. On the other hand, Haddad et al. [2017] have shown that, irrespective of the capital structure of the deals and their pricing, the main determinant of the volume of PE transactions is another macrofinancial magnitude, the equity risk premium. Their economic explanation is that, as the risk premium drops, the discount factor of future cash-flows also falls, and the present value of future profitability and efficiency gains increases. Moreover, the opportunity cost of holding illiquid assets diminishes: as the equity risk premium is mean reverting, a lower risk premium today forebodes return underperformance of publicly traded stocks in the future. In other words, a lower equity risk premium increases the expected value of a private equity investment, and reduces the expected return of a competing investment in publicly-traded stocks. This makes it easier for private equity asset managers to raise funds, and in practice reduces the cost of equity capital for the PE funds. In summary, lower credit

spreads and equity risk premium provide PE managers with a higher ability (cheaper and more abundant funding) and incentive (higher expected value) to carry out transactions.

Monetary policy, in principle, works in a different and broader way. It affects short-term *risk-free* rates, as opposed to credit spreads or risk premia. That is, monetary policy affects the baseline interest rates upon which those credit spreads and risk premia are added.[9] In that way, monetary policy ends up affecting both the total cost of credit and the total cost of equity capital for corporates, which credit spreads and equity risk premia affect additionally. That naturally leads to infer the existence of, respectively, credit and valuations channels of monetary policy that affect private equity transactions. Once again, following the insights of Axelson et al. [2013] and Haddad et al. [2017], the first channel affects the funding opportunity set of managers, while the second affects directly their incentives to close on corporate acquisitions.

In our analysis, we aim at estimating the effect of monetary policy that is independent from fluctuations in the credit spread and the equity risk premium as the traditional determinants of PE activity highlighted in the literature. To do so, we estimate the impact of changes in the monetary policy stance controlling for these two variables. As such, our estimates may understate the overall effect of monetary policy which may also have an impact on both credit spreads and equity risk premia. Credit spreads offer a financial compensation for bearing corporate default risk. That compensation may be affected by monetary policy, either with regards to the risk loading or its pricing per unit of risk. To the extent a tighter (looser) policy may lead to more (less) challenging business conditions for corporate borrowers, default risk compensation could be increased (reduced). Similarly, the equity risk premium is an expected excess return over a relevant short-term risk-free rate, in our case the 3-month US Treasury rate. Whether monetary policy affects the credit and equity risk

[9]In our sample, LIBOR was not exactly credit risk free, as it was an unsecured interbank rate, but in normal times the default risk was very low, liquidity premia were also narrow, and the rate was very influenced by monetary policy decisions. It also tracked closely the 3-month US Treasury bill rate, which we use to estimate the equity risk premium and is generally considered to be free of credit risk.

premium or not is an empirical question that needs to be answered separately. Such would be the case, for instance, if a change in monetary policy had a material impact on firms' profitability or investors' risk appetite.[10]

4 Data

The data for the analysis comprises information on private equity deals as well as on its determinants, specifically credit spreads, equity risks premia and monetary policy shocks. The sample period is January 2000 until January 2020.[11]

4.1 Private equity deals

We construct a dataset of private equity investments in non-financial corporations, gathering the data from LSEG Refinitiv. Our data search covered global transactions, but in practice they are concentrated in the United States.

To identify the deals, we first select the acquisitions of stakes in non-financial corporations by financial intermediaries different from banks. Next, we manually examine the financial acquirers and keep those transactions that correspond to funds managed by private equity (PE) firms, dropping acquirers classified as banks, insurance companies, real estate firms, or other non-financial corporations. Selecting which deals constitute acquisitions by

[10]The evidence suggests that monetary policy does have an impact on credit spreads. Specifically, credit spreads faced by private investors and corporates tend to widen when monetary policy tightens (see for instance Gertler and Karadi [2015], Caldara and Herbst [2019]). The impact on the equity premium, however, is less clear. Some studies find negative while other find a positive effect of monetary tightening on equity risk premia. See e.g. Laine [2023] for a review and new evidence.

[11]By ending the sample in 2020 we exclude the Covid-19 initial turmoil and its aftershocks, including a massive increase in global liquidity, the 2022 flare-up in global inflation and the subsequent forceful response of monetary policy. These extreme events would have introduced unnecessary outliers and noise in the sample.

a PE firm involves some judgment, as there is not a formal classification of these in the database user interface. Further, we keep only deals that are completed, and remove deals announced yet not completed, withdrawn, etc.

The resulting sample includes about 54,000 transactions, encompassing LBOs and other capital investments usually unlevered. Of the latter, we keep both acquisitions of controlling and minority stakes. We do not include private loans.

For each of these deals, we gather information on the transaction itself (amount, type, purpose, etc), the target firm (country, sector, financial data), and the PE firm. In addition, we record the exact date in which the deal was closed. Financial data on the target are often unavailable. Specifically, we have data about the targets' EBITDA in only 4,000 of the transactions retained, of which around 600 are LBOs.

For the subsample of LBOs we collect information on the syndicated loans and bonds arranged to finance the transactions. We are able to gather the data for 1,241 acquisitions, identifying a total of 845 loans and 63 bonds. In summary, our sample comprises 54,770 acquisitions of stakes in non-financial corporations by private equity funds. In 4,068 of these deals we have also information on the target EBITDA before the transaction. Moreover, 12,902 of the deals are LBOs, while the rest are non-LBOs. In most of the LBOs (90%) PE funds acquire the majority of the firm. By contrast, in a majority (60%) of non-LBOs PE funds acquire minority stakes.

4.2 Credit spreads, equity risk premia and monetary policy shocks

Following the previous literature, we measure the relevant credit spreads at a monthly frequency, and define it as the difference between a benchmark high-yield (HY) corporate bond

yield and 3-month LIBOR.[12]

We compute the equity risk premium quarterly in the same way as Haddad et al. [2017]. In brief, we conduct quarterly regressions of a measure of the expected excess return of the stock market onto the current dividend yield of the S&P 500 index and the equilibrium log consumption-wealth ratio – *cay* – from Lettau and Ludvigson [2001]. The expected stock market excess return for each quarter is computed as the annualized 3-year ahead realized excess return of the Total Return S&P 500 index minus the contemporaneous 3-month US Treasury bill rate. And we obtain the ratio *cay* from the dataset regularly updated by Martin Lettau on his website.[13] Then, we obtain our proxy of the equity risk premium as the fitted value of the estimated equation.

Monetary policy surprises are from Cieslak and Schrimpf [2019] who rely on a variation of the high-frequency identification (HFI) strategy pioneered by Kuttner [2001], Cochrane and Piazzesi [2002] and Gertler and Karadi [2015] to gauge monetary policy surprises. They measure the changes in certain key interest rates within tight intraday trading windows around major central banks' communication events. In addition, Cieslak and Schrimpf [2019] adjust those surprises to remove the "information effect" of central bank communications. That is, the effect on asset prices of central banks' views on the state of the business cycle, which are jointly disclosed together with monetary policy decisions. In that way, these measures intend to overcome some of the major identification challenges emerging from the fact that expected policy actions are endogenously determined together with economic variables, and so their correlations would not necessarily reflect a causal connection flowing from monetary policy to the economic variables (in our case the volume and pricing of PE deals). We resort to the surprises measured by the changes in the two-year US Treasury yield for most of our analyses, and conduct some further analysis utilizing the changes in the

[12]For the corporate bond yield, we rely on data from the Intercontinental Exchange (ICE), Bank of America (BofA) BBB US Corporate Bond Index. This is a subset of ICE BofA US Corporate Master Index tracking the performance of all securities with rating of BBB.

[13]https://sites.google.com/view/martinlettau/data.

ten-year US Treasury yield. Both measures are likely to reflect different types of surprises, with the 2-year tenor mostly reacting to target rate and forward guidance surprises, and the 10-year tenor responding to balance sheet policy surprises, such as quantitative easing news.

5 Monetary policy and private equity deal volumes

We start by investigating whether monetary policy surprises affect the dollar volume of PE activity. In particular, we test whether the aggregate dollar value of PE transactions respond significantly to such surprises.

5.1 Empirical model and estimation approach

We estimate the following empirical model:

$$lnDV_t = \alpha CS_t + \beta ERP_t + \gamma MP_t + \delta DV_{t-1} + \phi Q_t + \psi VIX_t + \varepsilon_t \tag{5.1}$$

The dependent variable $lnDV_t$ is the logarithm of the aggregate acquisition volume in US dollars, ie the deal volume in month t. CS_t is the HY credit spread in month t and ERP_t is the equity risk premium in month t, both computed in the way described in section 4. MP_t is the yield on the 2-year US Treasury note in month t, representing the stance of monetary policy. Q_t are quarterly dummies, to account for seasonality. Finally, we also include the contemporaneous average monthly value of the VIX_t, as a proxy of the general level of risk perceived in the economy in month t.

Notice that this is a time series setup, without cross-sectional information. The inclusion of the variables CS_t and ERP_t reflects the findings of previous literature, in particular

Axelson et al. [2013] and Haddad et al. [2017], respectively. Our main coefficient of interest, γ, measures the semi-elasticity of aggregate PE acquisition volumes to unanticipated changes in the 2 year interest rate. In line with our previous discussion, our main hypothesis is that an unexpected tightening of monetary policy should reduce the nominal volume of PE deals, as both the cost of debt and equity capital will increase. Based on the findings of previous literature, the coefficients of the credit spread and the equity premium should also be negative, if those variables have any significant individual effect. In view of the endogeneity issues mentioned above, we estimate equation (5.1) with a two-stage least squares procedure, where we instrument the 2 year US Treasury yield with monetary policy surprises from Cieslak and Schrimpf [2019]. Specifically, we use four instruments: the aggregate surprises for the 2-year yield in months t, $t-1$, $t-2$, and $t-3$. We perform tests of validity of the instruments. The null hypothesis is that instruments are weak (ie exhibit a low correlation with the 2 year interest rate). The tests strongly rejects the null, suggesting that the instruments are valid.[14] The remaining variables are instrumented with the residuals of univariate regressions on the 2-year yield.

5.2 Results

The dataset covers the period 1997-2018. The first column of Table 2 reports the results of including only the monetary policy surprises in the regression. As expected, the coefficient is negative and statistically significant at conventional levels of confidence. That is, an unexpected tightening of monetary policy by 100 basis points leads to a drop of 0.26% in the total dollar amount of PE deals closed during the month.[15]

In column II, the table presents the results of adding the credit spread to the specifi-

[14]The F-statistic of the joint hypothesis of non-significance of the instruments is 140, widely above the threshold that would suggest a very likely weak instrument problem (Stock et al. [2002]).

[15]We also report Hansen tests of instrument exogeneity, whose null hypotheses cannot be rejected at the usual confidence levels.

Table 2: **Monetary policy and PE activity.** This table reports results of a 2SLS estimation on the impact of monetary policy on PE activity. The dependent variable is the logarithm of the aggregate monthly dollar volume of PE deals. Robust standard errors in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*). The Overid test line shows the p-value of Hansen's test of overidentifying restrictions for the null hypothesis that the instruments are exogenous.

	I	II	III	IV
Lagged deal value	0.045***	0.010	0.008	0.007
	(0.01)	(0.01)	(0.01)	(0.01)
2 year yield	−0.261**	−0.417***	−0.513***	−0.526**
	(0.13)	(0.14)	(0.19)	(0.21)
Credit spread		−0.430***	−0.231***	−0.280***
		(0.06)	(0.08)	(0.06)
Equity risk premium			−0.087*	−0.092*
			(0.05)	(0.05)
VIX				0.013
				(0.02)
Observations	261	261	252	252
Adjusted R-squared	0.396	0.379	0.370	0.357
Model	IV	IV	IV	IV
Overid test (Hansen)	0.87	0.92	0.92	0.92

cation. Upon the addition of this variable, the lagged deal value stops being significant, and all explanatory power resides with the macrofinancial variables. The coefficient γ increases its magnitude by about 60%, and becomes significant at the 1% confidence levels, suggesting that before the coefficient was absorbing in part the combined effects of monetary policy surprises and changes in the credit spread. Notice that the credit spread also has a negative and clearly statistically significant coefficient: higher compensation for default risk also tends to discourage PE acquisitions, although not all of them are leveraged, as indicated above. This suggests that a market environment of more aggressive risk taking, implied in lower default risk compensation, encourages PE activity, whether leveraged or not. These results also suggest the presence of a strong credit channel that goes beyond the transmission of monetary policy surprises and includes exogenous shifts in credit spreads.

The next column adds the equity risk premium to the estimation. The equity premium coefficient also has the expected negative sign and is statistically significant, although the precision of the estimation is lower. A lower equity risk premium encourages PE deals, as future efficiency gains in the target companies have a higher present value, and the opportunity cost of investing in liquid stocks is lower due to the expected return to the mean of the risk premium. The coefficient of monetary policy surprises remains highly significant: a 100 basis points unexpected tightening reduces the value of closed PE deals by 0.5%. In contrast, the coefficient of the credit spread is halved in absolute value, but remains negative and highly significant. Finally, in column IV we add the VIX as a measure of overall macroeconomic risk, but its coefficient is not significant, and its addition does not change the results materially.

The strong response of deal volumes to the monetary policy surprises is remarkable, particularly in a sample that includes both levered and unlevered deals. The γ coefficient is almost twice as large as the coefficient of the credit spread, and five times the size of coefficient of the equity risk premium. The results in the last two columns suggest that

the valuation channel of monetary policy would absorb most of the effects related to swings in discount rates, as the equity risk premium retains only a relatively smaller impact with regards to the total volume of PE deals carried out: the significance of the coefficient of this variables is both statistically and economically weak.

Overall, the results of this section support the finding of a statistically significant role for the credit and valuation channels on the completion of PE deals. Those are expressed through statistically significant and economically large negative coefficients of monetary policy shocks, and also negative coefficients of credit spreads. The equity risk premium also has a negative but weaker effect. The weak result may in part be explained by a low information content in our estimate, despite the fact that similarly estimated proxies have been found to be adequate in other studies. Or the monetary policy surprises may be absorbing most of the systematic shifts related to a valuation channel. We conclude that credit constrains play a major role in LBOs, by enabling the implementation of desirable deals. The present value of future profitability gains, directly affected by the equity risk premium, seems more relevant for minority stake acquisitions, such as growth investment in mature firms or venture investment in new enterprises. This would be consistent with the more significant coefficients for the equity risk premium in the whole sample.

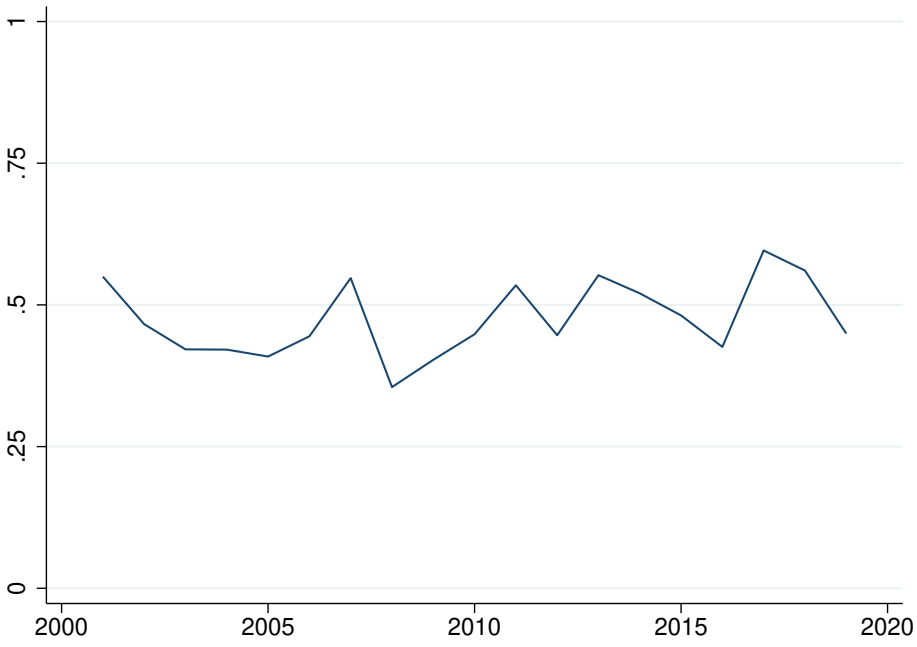
6 Monetary policy and leveraged deals

The evidence presented so far is consistent with a significant impact of monetary policy on the volume of PE deals completed. In this section, we examine a related aspect: how monetary policy affects the use of debt in the PE industry. Because of data limitations – we only observe the capital structure of a very limited subset of the deals – we proceed indirectly, through a variation of the analysis in the previous section. In particular, we study how monetary policy surprises affect the likelihood of observing LBO deals, which are

typically highly leveraged.

As noted, depending on the strategy, PE funds will fully finance their equity acquisitions by using their own capital in some cases. In others, they will rely in part on debt raised from banks or capital markets. That is usually the case of LBOs. Generally speaking, the debt-to-value (of the deal) ratio of the LBOs in our sample has remained stable during our sample period, hovering around 50%, as it is apparent in Figure 3. However, notice that data on the financial structure is only available for a subset of the transactions. In in this case, the sample size is reduced to slightly more than 1,200 deals.

Figure 3: **Debt share used in LBOs**



However, our dataset provides a well populated variable indicating the nature of the deal, that is, whether it is an LBO or not. As discussed above, LBOs are typically acquisitions of majority stakes in a target company, cofinanced with debt and the PE funds' own equity. Funding is raised through bank loans and/or corporate bonds that are added to the liabilities of the new entity created by the acquisition. By contrast, non-LBOs are typically equity investments not financed with debt. To a large extent non-LBOs reflect acquisitions of

minority stakes, as it is apparent in Table 3.[16] The table indicates that the vast majority of LBOs consist of acquisitions of majority stakes or assets, meaning the purchase of whole divisions which are spun off the main corporation. In contrast, more than half non-LBOs are acquisitions of partial interest.

Table 3: **Type of PE investments.** This table summarises the purpose of PE investments classified as leveraged buyouts (LBOs), and the rest. According the the description of the form of the deal, PE investments can aim at acquiring a partial stake, the majority of the firm, or assets

	LBOs	Non−LBOs
Acquisition majority interest	3,637	4,850
Acquisition partial interest	101	21,620
Acquisition assets	7,614	10,444
Other	1,550	4,954
Total	12,902	41,868

Our approach to test whether monetary policy impacts the debt-equity mix of PE deals consists in finding out whether unexpected changes in monetary policy in a given month affect the likelihood of observing LBOs instead of non-LBOs amid PE deals. To this end, we estimate the following equation with a probit model:

$$Pr(LBO_{i,j,m} = 1) = F(CS_m, ERP_q, MP_m, Z_i, \varepsilon_{i,j,m}) \tag{6.1}$$

As in previous specifications CS_m is the HY corporate bond spread during month m; ERP_q is the equity risk premium during quarter q; MP_m is the 2 year US Treasury yield. We also add the fixed effect variables controlling for the economic sector of the target firm

[16]We classify the specific form of the transaction into three categories. Acquisition of partial interest: deals in which the acquirer holds less than 50% of the target firm's capital and is seeking to acquire less than 50%, or the acquirer holds over 50% and is seeking less than 100% of the target company's stock. Acquisition of majority interest: comprises transactions in which the acquirer holds over 50% and is seeking to acquire 100% of the target company's stock. Acquisition of assets: deals in which 100% of a company's department or division is spun off and sold. The category Other includes deals with undisclosed purpose, mergers and recapitalisations.

Table 4: **Monetary policy and leveraged buyouts.** This table reports results of a probit model estimating the impact of monetary policy on the probability that a PE investment is a leveraged buyout. The dependent variable is a dummy taking value 1 if the type of deal is leveraged buyout, 0 otherwise. Robust standard errors in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*). The F-test line reports the p-value of the null hypothesis that the instruments are not significant in a first-stage linear regression of the 2-year yield on its instruments.

	I	II	III	IV
Credit spread	−0.044***	−0.101***	−0.117***	−0.127***
	(0.00)	(0.01)	(0.01)	(0.02)
Equity risk premium		0.010***	−0.004**	−0.008
		(0.00)	(0.00)	(0.01)
2 year yield			−0.095***	−0.121**
			(0.01)	(0.05)
VIX			0.002	0.004
			(0.00)	(0.00)
Observations	45443	37843	37843	37792
Model	PROBIT	PROBIT	PROBIT	IVPROBIT
ME				−0.03**
F-test				0.00

Z_i. The dependent variable $LBO_{i,j,m}$ is equal to 1 if the deal i in sector j in month m is an LBO.

Table 4 reports results of the probit estimation of equation (6.1). Since this estimation relies mostly on the number of deals and their classification, as opposed to specific financial details of the deal, the number of observations increases substantially to a range of between 37,000 and more than 45,000, depending on the specification. In column I we include only the credit spread in the model. Consistent with Axelson et al. [2013] and the previous section in dollar volumes, we find that better credit conditions or more aggressive risk-taking, that is lower credit spreads, increases the likelihood of observing LBOs. In column II we add the equity risk premium, which turns out to have a positive and significant coefficient. This anomaly is corrected in column III, which includes all explanatory variables: all variables have negative coefficients and are statistically significant, suggesting that easier financial

conditions or looser policy increase the likelihood of observing LBOs. In contrast with the previous section, the coefficient of the equity risk premium is relatively small but statistically significant. However, it is less economically significant: an increase in the equity risk premium equivalent to a standard deviation (387 basis points) leads to a fall of only 0.11% in the probability of observing LBOs. In the first two columns we estimated equation (6.1) using the raw variable measures. In column IV, we instrument the monetary policy variable in the same way as before. The results carry over largely unchanged from a qualitative perspective: easier policy and lower credit spreads encourage LBOs. In this specification, the equity risk premium coefficient is no longer statistically significant, echoing the limited economic relevance of this variable in column III.

7 Deal pricing

7.1 Empirical model and estimation approach

In this section we turn to the question of whether and how monetary policy affects the pricing of PE deals. In this deal-by-deal analysis, our pricing measure is the ratio of deal value to EBITDA of the target company, as described below. We estimate an empirical model, possibly non-linear, described by the following equation:

$$DV/EBITDA_{i,m} = G(CS_m, ERP_q, MP_m, VIX_m, Z_i, \varepsilon_{i,m}) \tag{7.1}$$

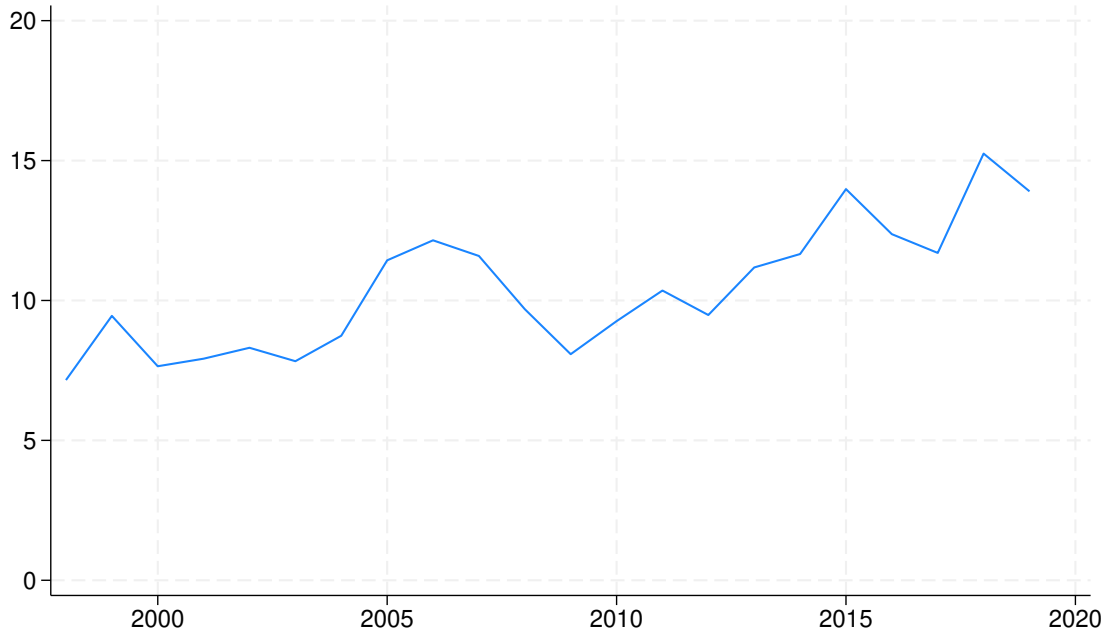
The dependent variable $DV/EBITDA_{i,t}$ is the ratio of the deal value (DV) to the EBITDA[17] of the target firm. Deal value is the price paid by the PE fund for the stake they acquire, ie the share of the firm's equity that they buy. The EBITDA measure is also scaled

[17]Earnings before interest, taxes, depreciation and amortization.

by this stake. In other words, this "deal value ratio" or "deal value multiple" is the amount paid per unit of EBITDA of target firm i in month m. CS_m is the credit spread in month m and ERP_q is the equity risk premium in quarter q, both defined in the way described above. MP_m is the monetary policy surprise reflected in the 2-year US Treasury yield. In most implementations we start with estimations that employ the observed changes in the yield, and then proceed to instrumentalise them with the monetary policy surprises from Cieslak and Schrimpf [2019], in the way explained in section 5. As before, we include the average monthly value of the VIX_m as measure of perceived risk in the economy. Finally, the cross-sectional variable Z_i is a categorical variable representing the economic sector of the target firm.

The cross-sectional dataset used for this estimation covers the period January 1997 through May 2020. The EBITDA of the target firms is often missing, and as a result our sample of deals for this analysis contains 3,841 transactions. Figure 4 shows that the value paid for target companies have been trending upwards during our sample period.

Figure 4: **Deal value to EBITDA ratios**



There are some challenges to the estimation of the model. Even after winsorising the DV-to-EBITDA ratio at the 2.5 and 97.5% to reduce the influence of outliers, the distribution of the dependent variable is highly non-normal – right-skewed with a lower bound at zero. In such setup, the model errors are unlikely to be iid, and OLS residuals will be typically heterokedastic. Thus, OLS coefficients will no longer be best linear unbiased estimators. For this reason, in our baseline exercise, we estimate the coefficients in equation (7.1) using a generalised method of moments (GMM) on a Poisson version of the equation. This amounts to estimating the equation in levels without the assumption that errors are independent and identically distributed.[18]

7.2 Results

Table 5 reports the results of the estimation. The marginal effects of the monetary policy variables – last row of the tables in this section – are scaled to reflect the impact of a 25 basis points unexpected change in monetary policy.

Column I reports the results of a specification that only includes the credit spread, but not monetary policy surprises or the equity risk premium. Axelson et al. [2013] was the first to point out this connection. As expected, the coefficient is negative and statistically significant: as market conditions become more risk averse and default risk pricing more conservative, PE fund managers also become more conservative and less aggressive in the pricing of the firms they acquire. Column II adds the equity risk premium, whose coefficient validates our expectations, based on our hypothesis and the previous literature: an increase in this premium reduces the pricing of completed private equity deals. In exchange, the coefficient of the credit spread is materially reduced and becomes less statistically significant than in the initial specification.

[18]The estimation follows the methodology described in Santos Silva and Tenreyro [2006].

Table 5: **Monetary policy and deal pricing: Poisson model.** This table reports results of a Poisson model estimating the impact of monetary policy on the deal value-to-EBITDA ratio of PE buyouts. The dependent variable is the deal value-to-EBITDA ratio, winsorised at 2.5% and 97.5%. Robust standard errors in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*). The Overid test line shows the p-value of Hansen's test of overidentifying restrictions for the null hypothesis that the instruments are exogenous.

	I	II	III	IV
Credit spread	−0.032***	−0.011**	−0.010*	−0.042
	(0.00)	(0.00)	(0.01)	(0.04)
Equity Risk Premium		−0.003***	−0.025***	−0.039**
		(0.00)	(0.00)	(0.02)
2 year yield			−0.123***	−0.215**
			(0.01)	(0.11)
VIX			−0.000	0.007
			(0.00)	(0.01)
Observations	3841	3465	3465	3456
Model	POISSON	POISSON	POISSON	IVPOISSON
ME				−0.86**
Overid test (Hansen)				0.91

Column III reports the result for the full model without yet instrumentalising the 2-year Treasury yield. The three coefficients have the expected negative sign and are statistically significant at conventional confidence levels. Thus, increases in all three variables, the credit spread, the equity risk premium, and a monetary policy tightening, tend to reduce the price paid by PE funds on their acquisitions. However, some nuances arise. First, the coefficient for the credit spread is further reduced, being only significant with a 10% level. Second, the coefficient of the equity risk premium is highly significant. Notice that despite the equity risk premium having a relatively muted impact on the aggregate volume of PE deals, it does have a quite a distinct effect in pricing at the deal level. And the impact is consistent with the intuitive explanation provided in Haddad et al. [2017]: as the equity risk premium falls, the present value of future profitability gains are higher, so the deals become more valuable and their pricing increases. Finally, a monetary tightening leads to a statistically significant drop in the pricing of PE deals with very high confidence.

In column IV we repeat the previous estimation but instrumentalising the changes in the 2-year yields with monetary policy surprises, in order to remove endogenous effects. The results confirm the findings presented in column III, even increasing the size of the coefficients of monetary policy and the equity premium, while the coefficient of the credit spread is no longer significant. Since this model is non-linear, the coefficients in the table do not represent the actual marginal effect – in natural units – of changes in the independent variables. To have a better sense of the economic size of the response to monetary policy surprises, the last line of column IV reports the marginal effect of a tightening surprise of 25 basis points. The effect is economically large: the deal value multiple drops by 0.86%.

It is instructive to compare our results with the previous findings by Axelson et al. [2013] and Haddad et al. [2017]. While the latter study had found that the equity risk premium was the key determinant of buyout activity, both in number of deals and their aggregate value, it had not directly addressed the deal pricing aspect. And Axelson et al. [2013] have found that credit spreads are an important determinant of both transactions volume and pricing. Our results so far suggest that, once monetary policy is taken into account, the equity risk premium is a more relevant determinant of pricing than credit spreads, which are more consequential with regards to deal volume. And monetary policy surprises matter for both elements of PE activity. Focusing on pricing, the "credit channel" of monetary policy, through the shift introduced in risk free rate benchmarks, overwhelms the moves in credit spreads that are unrelated to monetary policy. On the other hand, there is a separate effect of the equity risk premium on deal pricing, over and above the "valuation channel" that monetary policy shapes. The risk free rate and the equity risk premium determine the discount rate of a deal, and therefore its value. As a result both policy rates and equity risk premium influence the pricing. But credit spreads only affect the availability of funding to close transactions, which is why they would have a significant effect on the volume of deals closed, but not on their valuation. At a practical level, this suggest that the ultimate constraint on pricing is the cost of equity capital (ie the equity

risk premium), given the relative stability of leverage documented in Figure 3. That is, once the GP has decided how much capital to spend on a given deal – which given the stance of policy depends on the equity risk premium – that amount will be scaled up by a relatively stable leverage ratio. Ultimately, any effect that credit conditions may have on pricing are shaped mainly by shifts in monetary policy rates and not by credit spreads.

Deal pricing could also vary with features specific to the target firm that are unobserved to the econometrician. Pricier deals are likely to command idiosyncratic features that makes them more valuable. Different "intangibles" may be driving such pricing: availability of better technology than the competition, a stronger client base, or even acute management inefficiencies in a fundamentally healthy company with a strong product and market. Whatever the case, GPs must expect particularly high gains from the restructuring of a company in order to be willing to pay more for it. That implies that pricier deals may be differently sensitive to unexpected changes in monetary policy or innovations in the macrofinancial variables. In fact, we would expect a larger impact of tighter policy or higher risk premiums: as the deals become more valuable, the losses in present value of higher discount rates would also be larger.

In order to assess this point, we conduct a quantile regression exercise, estimating the impact of monetary policy for different quantiles of the deal pricing distribution. Since quantile regressions are based on OLS, we first estimate equation (7.1) with a simple OLS to see if the estimates are not too far off the baseline Poisson estimates, despite the methodological caveats already mentioned. Table 6 presents the results. The key message to take from this is that the results are qualitatively similar to those of Table 5. The first three columns estimate the model with variables in natural levels, and column IV instrumentalises the 2-year Treasury yields. Once again, the credit spread coefficient is only statistically significant in the specification in which it appears alone. Once monetary policy and the equity risk premium are included, the significance of the credit spread vanishes. Column IV

Table 6: **Monetary policy and deal pricing: Ordinary least squares estimation.** This table reports results of an OLS estimating the impact of monetary policy on the deal to EBITDA of PE buyouts. The dependent variable is the deal-to-EBITDA, winsorised at 2.5% and 97.5%. Robust standard errors in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*). The Overid test line shows the p-value of Hansen's test for the null hypothesis that the instruments are exogenous.

	I	II	III	IV
Credit spread	−0.515***	−0.171	−0.149	−0.586
	(0.16)	(0.26)	(0.30)	(0.55)
Equity risk premium		−0.047	−0.390***	−0.608**
		(0.05)	(0.07)	(0.26)
2 year yield			−1.927***	−3.272**
			(0.31)	(1.56)
VIX			−0.001	0.111
			(0.04)	(0.13)
Observations	3841	3465	3465	3456
Adjusted R-squared	0.016	0.017	0.034	0.028
Model	OLS	OLS	OLS	IVOLS
ME			−0.48***	−0.82**
Overid test (Hansen)				0.91

shows that a monetary policy tightening of 25 basis points reduces the deal value multiple by 0.82%, almost identical to the Poisson marginal effect estimate. Additionally, an increase of 1 percentage point in the equity risk premium reduces the deal price by 0.6%.

Having established that the OLS results are qualitatively similar to the Poisson estimates, we test whether the impact of monetary policy changes with the value of the deal by running quantile OLS regressions, testing whether the impact of the independent variables varies across the distribution of the dependent variable. Table 7 reports the estimated coefficients for percentiles 25, 50 and 75 in columns I, II and III, respectively. As a benchmark for comparison, we repeat in column IV the results shown in the same column of Table 6.

The results support the notion that the impact of monetary policy on deal pricing increases with the value of the deal. The coefficients of the three variables across all percentiles are negative and statistically significant. The coefficients for the pricier deals, those in the

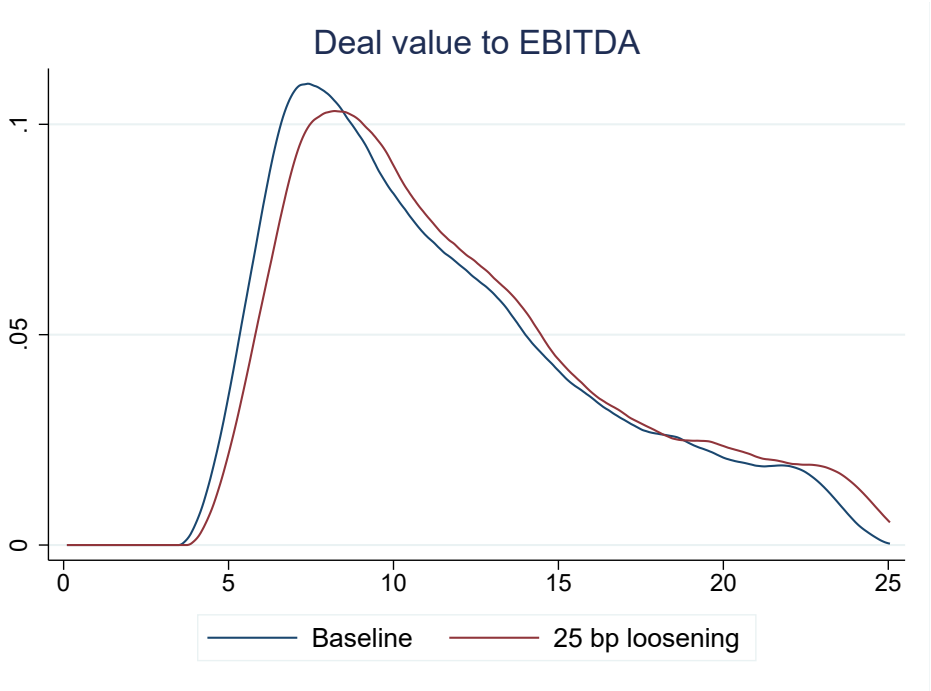
Table 7: **Monetary policy and deal pricing: Quantile regressions.** This table reports results of quantile regressions estimating the impact of monetary policy on the deal value-to- EBITDA ratio of PE buyouts. The dependent variable is the deal-to-EBITDA ratio, winsorised at 2.5% and 97.5%. Robust standard errors in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III	IV
Credit spread	−0.995***	−1.007***	−1.456**	−0.586
	(0.31)	(0.12)	(0.63)	(0.55)
2 year yield	−2.369***	−2.679***	−4.406***	−3.272**
	(0.88)	(0.81)	(1.64)	(1.56)
Equity risk premium	−0.386***	−0.435**	−0.746**	−0.608**
	(0.15)	(0.18)	(0.34)	(0.26)
VIX	0.163*	0.152**	0.235	0.111
	(0.09)	(0.07)	(0.16)	(0.13)
Observations	4516	4516	4516	3456
Adjusted R-squared				0.028
Model	IVQLp25	IVQLp50	IVQLp75	IVOLS
ME	−0.59***	−0.67***	−1.10***	−0.82**

75th percentile, are considerably larger than those in the 25th and 50th percentile, and also larger than those of the unweighted OLS estimation reproduced in column IV. A monetary policy tightening surprise of 25 basis points leads to a drop in the deal value ratio of 1.1%, in contrast to 0.82% resulting from the unweighted estimation, and 0.6% drop for deals in the 25th percentile. The coefficients of the equity risk premium also reveal a much lower sensitivity of the cheaper deals, with the coefficient for the 75th percentile almost doubling the coefficient in the 25th percentile. In summary, an increase in policy rates and the equity risk premium tend to reduce more the pricing of the more expensive deals. Notice the credit spread coefficient is statistically significant in all cases, suggesting that the non-significant result for the full sample may result from compositional effects. Yet its coefficient varies little across quantiles, suggesting that this variable still affects pricing differently from the other two.

In the next step, we assess the impact of monetary policy on the entire distribution of deal valuations. We sequentially perform quantile regressions for a grid of 100 equally-spaced

Figure 5: **Impact of a 25 bp monetary policy loosening on the deal value-to-EBITDA ratio:** Kernel showing the distribution of the deal value-to-EBITDA ratio.



reference points within the range of the 15th through the 80th percentiles of the deal value ratio variable. From these regressions we obtained, for each reference point in the grid, the point estimate of the deal value ratio after a 25 basis points loosening of monetary policy. Further, we use these point estimates to estimate the probability density function of the post-loosening deal value ratio, and the original data to estimate the probability density function of the pre-loosening deal value ratio.

The results of the approach are shown in Figure 5which shows the impact of a 25 bp expansionary monetary policy shock on the distribution of the deal value-to-EBITDA ratios. The figure shows that the distribution of the deal value ratio shifts slightly but distinctly to the right (i.e toward higher prices) in the wake of an unexpected loosening of monetary policy by 25 basis points. The impact is stronger on the right tail of the distribution, indicating a particularly strong effect of loose monetary policy on high end of deal valuations.

8 Shocks to long-term yields

So far, the analyses have focused on monetary policy surprises that affect the short end of the term structure, in particular yields of 2-year US Treasury notes. These shocks comprise surprises with regards to target rate decisions as well as forward guidance news. However, after the Great Financial Crisis, monetary policy operated to a significant extent through large-scale purchases of long-term bonds (quantitative easing). As a consequence, monetary policy decisions and announcements related to such bond purchases also gave rise to surprises affecting the long end of the term structure of interest rates.

Against this background, we assess in this final section monetary policy surprises affecting long-term yields impact private equity activity. To this end we add to our dataset HF monetary policy surprises for the 10-year yield of US Treasury notes, again taken from Cieslak and Schrimpf [2019]. As before, in regressions involving the monetary policy variables, we resort to 2SLS procedures, where we instrumentalise the 10-year shocks with aggregate surprises recorded during the previous four months (see section 5).[19]

It turns out that monetary policy shocks to the 10-year yield exert a weaker effect on PE activity than monetary policy shocks affecting short-term yields. This reflects the fact that PE deals are primarily funded through own equity contributions, in the case of venture and growth investments, and short-maturity rather than long maturity debt in the case of LBOs.[20] For deal volumes, the results are reported in Table 8 for the whole sample, ie not limited to LBOs. Column I presents the simplest specification, where only the monetary shocks are included. In contrast with the results in Table 2 for the 2-year yield surprises,

[19] We also perform a weak instruments test on this specification. The corresponding F-statistic is 164.9.

[20] As described in section 2, LBOs are financed mostly by a combination of equity contributions and debt, where the debt takes usually the form of leveraged loans provided by a syndicate of banks. These loans have floating-rate coupons, which makes them sensitive to changes in short-term interest rates. See Goel [2018] and Nadauld and Weisbach [2012] for a description of the financial structure of leveraged loans, and Core et al. [2025] for a discussion of the impact of floating rate borrowing agreements on the transmission of monetary policy.

monetary policy surprises affecting the long end do not seem to have a statistically significant impact on PE deal volume. In column II we report the results for the specification that adds credit spreads. As before, the coefficient of the credit spreads is negative and significant, as expected, and the absolute value of the coefficient of the monetary surprise increases materially. But the precision of the estimation is not good, and the coefficient is not statistically significant at the conventional confidence levels. However, the sign of the coefficient is negative, as expected. Finally in column III we report the results for the full specification, including the equity risk premium. The coefficient of this last variable is not significant, mirroring the results for the 2-year yields. But the precision and fit of the model improves, and both the coefficient of monetary policy and credit spreads become negative and statistically significant at 95% confidence level. In summary, these results confirm the relevance of a credit channel in shaping the response of PE deal volume to monetary policy surprises, although they also hint at possibly a relatively weaker or noisier signal carried by shocks that impact long term yields.

For the pricing of PE deals, the effects are not statistically significant. As before, we estimate a Poisson model with an IV procedure. The results are reported in Table 9. Column I reports the results for the model that only includes credit spreads. As before, the coefficient is negative and highly statistically significant. In column II we add the equity risk premium, which is negative and highly significant. As before, the inclusion of the equity risk premium renders the credit spread no longer significant. Finally in column III we add the monetary policy shocks affecting the yields of 10-year US Treasury notes. Both the coefficients of credit spreads and the monetary policy shocks are not statistically significant. And the economic effect of a 25 basis points tightening becomes a very small 6 basis points, in contrast with the 86 basis points response to shocks to the 2-year yield. In summary, these results confirm that the equity risk premium remains a relevant factor in determining the pricing of PE deals, while monetary policy shocks to long term yields are not.

Table 8: **Monetary policy shocks to long term yields and PE activity:** This table reports results of a 2SLS estimation of the impact on PE deal volume of monetary policy shocks that affect long term yields. The dependent variable is the logarithm of the aggregate monthly dollar volume of PE deals. Robust standard errors in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*). The F-test line shows the p-value of Hansen's test for the null hypothesis that the instruments are exogenous.

	I	II	III
Lagged deal value	0.059***	0.015	0.022**
	(0.02)	(0.02)	(0.01)
10 year yield	−0.019	−0.513	−0.436**
	(0.27)	(0.32)	(0.22)
Credit spread		−0.241***	−0.184**
		(0.06)	(0.09)
Equity risk premium			−0.010
			(0.03)
Observations	261	261	252
Adjusted R-squared	0.382	0.557	0.577
Model	IV	IV	IV
Overid test (Hansen)	0.76	0.87	0.86

Table 9: **Monetary policy shocks to long term yields and deal pricing.** This table reports results of a Poisson model estimating the impact of monetary policy surprises affecting long term yields on deal value-to-EBITDA ratios for LBOs. The dependent variable is the deal value-to-EBITDA ratio, winsorised at 2.5% and 97.5%. Robust standard errors in parentheses. Statistical significance is denoted at 1% (***), 5% (**) and 10% (*).

	I	II	III
Credit spread	−0.053***	−0.008	0.004
	(0.01)	(0.01)	(0.02)
Equity risk premium		−0.004***	−0.016**
		(0.00)	(0.01)
10 year yield			−0.015
			(0.06)
Observations	3665	3465	3456
Model	POISSON	POISSON	IVPOISSON
ME			−0.06

9 Conclusions

Private markets are becoming increasingly important in the financing of economic activity, innovation, and improving the productivity of firms through restructurings. No longer a niche play, it is important to understand what transmission channels of monetary policy may be operating through this sector. Amid the many existing strategies, we choose to focus on private equity acquisitions, including LBOs, venture capital and growth investment. Additional work is needed to understand the transmission of monetary policy in other increasingly relevant subsectors of private markets, such as direct lending and real assets.

Two main questions drive our analysis: (i) how does monetary policy affect the volume of PE deals, and (ii) how does it affect the pricing of those deals. Consistent with previous studies that, however, have not investigated the role of monetary policy, we identify a credit and a valuation channel shaping these two variables. Monetary policy shocks impacting the short end of the yield curve affect both of them. On the credit side, monetary policy affect the cost of credit that some of these transactions, particularly LBOs, need to be implemented. As a result, looser policy seems to encourage a higher volume of PE deals. On the valuation side, monetary policy affect the risk-free rates that are key component of discount rates together with the equity risk premium. That has an impact on the present value of the gains that PE managers can obtain by restructuring firms or investing in upstart companies, and ultimately, the expected value and effective pricing of the acquisitions. Consistent with this rationale, our results indicate that looser policy encourages higher pricing of LBO deals. We further find evidence of non-linearities in this link, with stronger effects playing out in higher price segments of PE deals.

Our results also indicate a highly significant effect on the use of leverage in PE deals. Specifically, looser monetary policy also seems to increase the likelihood of observing LBO transactions instead of non-LBOs. This implies that accommodative monetary policy in-

creases the reliance on leverage of PE managers and may hence indirectly raise the leverage of the corporate sector in the extensive margin.

Finally, monetary policy shocks that affect long term yields seem less powerful: our estimates suggest that their role in shaping the credit channel is less clear, and their role vanishes with regards to the valuation channel. This finding is consistent with the observation that PE deals are funded through shorter maturity debt. This implies that, while conventional monetary policy is effectively transmitted through the PE sector, the transmission of unconventional monetary policy working on the longer end of the yield curve may be be limited.

References

Adra, S., L. Barbopoulos, and A. Saunders (2020): "The impact of monetary policy on M&A outcomes," *Journal of Corporate Finance*, 62.

Aramonte, S. and F. Avalos (2019): "Structured finance then and now: A comparison of CDOs and CLOs," *BIS Quarterly Review*, September, 11–14.

——— (2021): "The rise of private markets," *BIS Quarterly Review*, December, 69–82.

Avalos, F., S. Doerr, and G. Pinter (2025): "The global drivers of private credit," *BIS Quarterly Review*, March, 13–30.

Axelson, U., T. Jenkinson, P. Stroemberg, and M. Weisbach (2013): "Borrow cheap, buy high? The determinants of leverage and pricing in buyouts," *Journal of Finance*, 68, 2223–67.

Banerjee, R. and J. Serena (2024): "Dampening the financial accelerator? Direct lenders and monetary policy," *Journal of Money, Credit and Banking*.

Bellavitis, C., C. Fisch, and S. Vismara (forthcoming): "Monetary policy and venture capital markets," *Review of Corporate Finance*.

Borio, C. (1990a): "Leverage and financing of non-financial companies: An international perspective," *BIS Economic Papers*, 27.

——— (1990b): "Banks involvement in highly leveraged transactions," *BIS Economic Papers*, 28.

Boucly, Q., D. Sraer, and D. Thesmar (2011): "Growth LBOs," *Journal of Financial Economics*, 102, 432–453.

Caldara, D. and E. Herbst (2019): "Monetary policy, real activity, and credit spreads: Evidence from Bayesian proxy SVARs," *American Economic Journal: Macroeconomics*, 11, 157–192.

Chen, K., J. Ren, and T. Zha (2018): "The nexus of monetary policy and shadow banking in China," *American Economic Review*, 108, 3891–3936.

Chevalier, J. (1995): "Do LBO supermarkets charge more? An empirical analysis of the effects of LBOs on supermarket pricing," *Journal of Finance*, 50, 1095–1112.

Chevalier, J. and D. Scharfstein (1996): "Capital-market imperfections and countercyclical markups: Theory and evidence," *American Economic Review*, 86, 703–725.

Cieslak, A. and A. Schrimpf (2019): "Non-monetary news in central bank communication," *Journal of International Economics*, 118, 293–315.

Cochrane, J. and M. Piazzesi (2002): "The Fed and interest rates – a high-frequency identification," *American Economic Review*, 92, 90–5.

Core, F., F. D. Marco, T. Eisert, and G. Schepens (2025): "The supply side of monetary policy: how floating-rate loans blunt the ECB's fight against inflation," *SUERF Policy Brief*, July.

Cucic, D. and D. Gorea (2024): "Non-bank lending and the transmission of monetary policy," *BIS Working Papers*, 1211.

Drechsler, I., A. Savov, and P. Schnabl (2022): "How monetary policy shaped the housing boom," *Journal of Financial Economics*, 144, 992–1021.

Elliot, D., R. Meisenzahl, J. Peydro, and B. Turner (2022): "Nonbanks, banks, and monetary policy: U.S loan-level evidence since the 1990s," *Federal Reserve Bank of Chicago Working Papers*, 2022-27.

Fischer, J. and C. Horn (2021): "Does monetary policy affect mergers and acquisitions?" *mimeo*.

Gertler, M. and P. Karadi (2015): "Monetary policy surprises, credit costs, and economic activity," *American Economic Journal: Macroeconomics*, 7, 44–76.

Goel, T. (2018): "The rise of leveraged loans: a risky resurgence?" *BIS Quarterly Review*, September, 10–11.

Haddad, V., E. Loualiche, and M. Plosser (2017): "Buyout activity: The impact of aggregate discount rates," *Journal of Finance*, 72, 371–414.

Haque, S. M. (2023): "Does private equity over-lever portfolio companies?" *Board of Governors of the Federal Reserve System Finance and Economics Discussion Series*, 2023-009.

Haque, S. M., S. Mayer, and T. Wang (2024): "How private equity fuels non-bank lending," *Board of Governors of the Federal Reserve System Finance and Economics Discussion Series*, 2024-015.

Ivashina, V. (2022): "When the tailwind stops: The private equity industry in the new interest rate environment," *LTI Report I, CEPR Press*.

——— (2023): "Chapter 4 - Private equity financing," in *Private Equity and Entrepreneurial Finance*, ed. by B. E. Eckbo, G. M. Phillips, and M. Sorensen, North-Holland, vol. 1 of *Handbook of the Economics of Corporate Finance*, 139–160.

Ivashina, V. and J. Lerner (2019): *Patient capital: The challenges and promises of long-term investing*, Princeton University Press.

Kaplan, S. (1989): "The effect of management buyouts on operating performance and value," *Journal of Financial Economics*, 24, 217–254.

Kuttner, K. (2001): "Monetary policy surprises and interest rates: Evidence from the Fed funds futures market," *Journal of Monetary Economics*, 47, 523–44.

Laine, O.-M. (2023): "Monetary policy and stock market valuation," *International Journal of Central Banking*, 19, 365–416.

Lettau, M. and S. Ludvigson (2001): "Resurrecting the (C)CAPM: A cross-sectional test when risk premia are time varying," *Journal of Political Economy*, 109, 1238–87.

Lichtenberg, F. and D. Siegel (1990): "The effects of leveraged buyouts on productivity and related aspects of firm behavior," *Journal of Financial Economics*, 27, 165–194.

Nadauld, T. and M. Weisbach (2012): "Did securitization affect the cost of corporate debt?" *Journal of Financial Economics*, 105, 332–52.

Santos Silva, J. and S. Tenreyro (2006): "The log of gravity," *Review of Economics and Statistics*, 88, 641–58.

Stock, J., J. Wright, and M. Yogo (2002): "A survey of weak instruments and weak identification in generalized method of moments," *Journal of Business and Economic Statistics*, 20, 518–29.

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